

# Indication for Laparoscopically Assisted Vaginal Hysterectomy

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## ABSTRACT

**Objectives:** Total hysterectomy procedures include total abdominal hysterectomy (TAH), total vaginal hysterectomy (TVH), and laparoscopically assisted vaginal hysterectomy (LAVH). Our institution has introduced LAVH as a preferred option to the more invasive TAH. To date, no reports have proposed surgical indications for LAVH based on statistical analysis of surgical results. The purpose of this study was to establish criteria for performing LAVH through statistical analysis of a retrospective review of surgical outcomes in LAVH cases at our institution over a period of 15 years.

**Methods:** The medical records of 629 patients scheduled for LAVH for uterine fibroids and/or adenomyosis at our hospital were examined. Surgical results (blood loss, operative time, rates of conversion to laparotomy, and intra- and postoperative complications) were compared among 9 groups classified by uterine weight.

**Results:** Statistically significant differences in surgical outcomes were found between the group with a uterine weight  $\geq 800$ g and the other groups.

**Conclusion:** We found that when the uterine weight was  $\geq 800$ g, TAH was more appropriate because significant blood loss and/or complications would be expected during LAVH. A removed uterus weighing 800g is reportedly equivalent to a preoperative uterine size of approximately 12cm. Therefore, LAVH may be safely indicated for patients with a uterine size  $\leq 12$ cm (approximately equivalent to the uterine size at 16-weeks gestation).

**Key Words:** Uterine fibroid, Uterine adenomyosis, Laparoscopically assisted vaginal hysterectomy (LAVH), Surgical indication.

## INTRODUCTION

Conventional approaches to total hysterectomy include total abdominal hysterectomy (TAH) and total vaginal hysterectomy (TVH). TVH is a method by which all maneuvers are performed vaginally, and is thus less invasive than TAH. The indications for TVH, however, are largely limited by uterine size, flexibility of the vagina, and surgical history. In the past, TAH was selected for cases that were beyond the indications for TVH. Into this background, laparoscopic total hysterectomy procedures were introduced approximately 20 years ago.<sup>1</sup> Laparoscopic total hysterectomy (LTH) in cases for which TAH was previously indicated is less invasive,<sup>2,3</sup> and has been reported to cause significantly less tissue damage than traditional TAH.<sup>4-6</sup> The benefits of LTH have included decreased intraoperative blood loss, decreased risk of postoperative infections, shorter hospital stays, and shorter periods of convalescence.<sup>7-9</sup>

Among the different LTH techniques is the laparoscopically assisted vaginal hysterectomy (LAVH). In our institution, we have incorporated LAVH as a preferred alternative to the more invasive TAH. As with TVH, the surgical indications for LAVH are limited by uterine size.<sup>10</sup> The maximum uterine size indicated for LAVH varies with the experience and skill of the surgeon, and has therefore been reported differently in different studies.<sup>11</sup> Based on our review of the literature, we have found no study that determines surgical indications for LAVH on the basis of statistical analysis of surgical results. Therefore, the purpose of this study was to establish indications for LAVH by statistical analysis of a retrospective review of the surgical outcomes in LAVH cases performed in our hospital over a period of approximately 15 years.

## MATERIALS AND METHODS

This study comprises a population of 629 female patients with uterine fibroids or adenomyosis in whom LAVH was attempted at our hospital between January 1995 and December 2009. The patients were classified into 9 groups based on the removed uterine weight in increments of 100g, from  $<100$ g to  $\geq 800$ g. The mean values of blood loss, operative time, rates of conversion to laparotomy,

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and intra- and postoperative complications were compared among the groups. The definitions of intraoperative complications in our department are as follows: transfusion and conversion from laparoscopic surgery to laparotomy due to difficulty in controlling bleeding; intraoperative incidents specific to laparoscopic surgery; or incidents during LAVH. Our definitions of postoperative complications are as follows: postoperative complications specific to laparoscopic surgery (eg, subcutaneous emphysema/hematoma); cases requiring further surgery (laparoscopic or open); significant prolongation of the hospital stay due to various postoperative problems attributable to laparoscopic procedures; and/or complications attributable specifically to the LAVH procedure.

In statistical analyses to compare 3 or more groups, an ANOVA and the Scheffe procedure were used. For comparison of rates, a chi-square test was performed. In all the tests, a P value <.05 was considered statistically significant.

**Surgical Procedure**

Following insertion of an intrauterine manipulator, an insufflation needle was inserted through the umbilicus and closed pneumoperitoneum was established. A 5-mm trocar was then inserted through the umbilicus for the introduction of the laparoscope. Second and third 5-mm trocars were placed in the left and right lower abdominal quadrants, respectively, and a fourth 5-mm trocar was placed in the midline between the second and third trocars. The Douglas pouch and the course of the urinary tract were identified, and the round ligament was coagulated and resected, followed by coagulation and resection of the fallopian tube and the proper ovarian ligament. Similar procedures were carried out on the opposite side, after which the peritoneum of the vesicouterine pouch was detached and resected. At this point, the vaginal procedure was begun. The bladder was dissected from the surface of the uterus and the Douglas pouch was opened, preceding resection and ligation of the sacrouterine ligament. After this, the cardinal ligament was resected and ligated, and the vesicouterine pouch entered. The uterine artery was ligated and resected, and the uterus was removed. After hemostasis was assured, the vaginal walls were sutured, and the laparoscopic procedure was resumed, during which hemostasis was reconfirmed and both ends of the cut sacrouterine ligaments were approximated to the apex of the vagina and sutured. The abdominal cavity was irrigated and the surgery was completed.

**RESULTS**

**Table 1** summarizes blood loss and operative time, conversion rate to laparotomy, and intra- and postoperative complication rates in the 9 groups classified by uterine weight in increments of 100g. In the ≥800g group, mean blood loss of 718mL and mean operative time of 195 minutes were demonstrated by our statistical analyses to be significantly higher than in any of the other groups.

**Table 2** summarizes the conversion rate to laparotomy and the intra- and postoperative complication rates in the 9 groups. Here again, the group with uterine weights ≥800g showed statistically significant differences in the rates of cases converted to laparotomy (37.1%) and intraoperative complications (19.5%) compared with the other groups.

**DISCUSSION**

The indication for LAVH varies depending on reports. Marana et al<sup>11</sup> have reported that LAVH is indicated for a uterus weighing between 280g and 700g. These indications, however, are based on the experience and skill of the surgeon. In our literature search, we have not found any studies that investigate the indications for LAVH based on systematic statistical review of surgical results. This study has undertaken a statistical analysis of a retrospective review of 629 cases in our institution over a period of 15 years and demonstrated that when an LAVH is performed on a patient with a uterine

**Table 1.**  
Correlations Between Uterine Weight, Blood Loss, and Operative Time

Uterine Weight (g)	n	Blood Loss (mL)	Operative Time (min)
<100	16	152 ±188	135 ±36
100≤200	66	130 ±127	133 ±40
200≤300	121	159 ±157	138 ±40
300≤400	116	179 ±162	141 ±34
400≤500	90	215 ±226	149 ±41
500≤600	63	243 ±204	153 ±36
600≤700	41	259 ±229	154 ±37
700≤800	25	338 ±307	162 ±38
>800	26	718 ±624 <sup>a</sup>	195 ±51 <sup>a</sup>
Total	564	219 ±256	146 ±41

<sup>a</sup>The differences between the >800 g group and all other groups were statistically significant (P<.05).

**Table 2.**

Correlations Between Uterine Weight and Rate of Conversion to Laparotomy, and Intra- and Postoperative Complication Rates

Uterine Weight (g)	Conversion to Laparotomy	Intraoperative Complication	Postoperative Complication <sup>b</sup>
<100	5.9% (1/17)	0% (0/17)	0% (0/16)
100≤200	8.3% (6/72)	2.8% (2/72)	0% (2/66)
200≤300	5.5% (7/128)	1.6% (2/128)	1.6% (2/121)
300≤400	4.1% (5/121)	0.8% (1/121)	1.7% (2/116)
400≤500	11.8% (12/102)	2.9% (3/102)	2.2% (2/90)
500≤600	12.5% (9/72)	4.2% (3/72)	1.6% (1/63)
600≤700	14.6% (7/48)	2.1% (1/48)	4.8% (2/41)
700≤800	10.7% (3/28)	3.5% (1/28)	0% (0/25)
>800	37.1% (15/41) <sup>a</sup>	19.5% (8/41) <sup>a</sup>	0% (0/26)
Total	10.3% (65/629)	3.3% (21/629)	2.0% (11/564)

<sup>a</sup>The differences between the > 800 g group and all other groups were statistically significant (P<.05).

<sup>b</sup>Only the completed cases are counted.

weight ≥800g, the mean blood loss, mean operative time, and the rate of conversion to laparotomy are all significantly higher than in patients with lower uterine weights (eg, postremoval uterine weights from <100g to ≤800g). Therefore, we propose that when the uterine weight is ≥800g, TAH is more appropriate, because significant blood loss and/or complications would be expected if LAVH were selected.

In this study, the uterine weight refers to the weight of the removed uterus as recorded postoperatively. Tobi-ume et al<sup>12</sup> have demonstrated a strong correlation between preoperative uterine size (volume calculated from the 3 axes) measured with MRI and the removed uterine weight recorded postoperatively. They have calculated that a removed uterus weighing 800g is approximately equivalent to a 12-cm uterine size in situ (or the approximate equivalent to a 16-week gestation on pelvic examination).

**CONCLUSION**

Based on our findings in this study, we consider a uterus <12cm on preoperative measurement to be an appropriate indication for LAVH.

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